

Appl. No. : 09/836,674
Filed : April 16, 2001

Amendments to the Claims:

This listing of claims, in which Claims 1, 20 and 36 are amended, will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. **(Currently amended)** A method for growing a thin film on a surface of a substrate in a reactor according to the ALD method, said method comprising:

providing a first conduit for delivering a pulse of a first vapor phase reactant and a second conduit for delivering a pulse of a second vapor phase reactant to said reactor;

providing at least a first substrate in a pre-reaction chamber that is defined by a plurality of walls and a second substrate in a reaction chamber, said first substrate being positioned downstream of a point in the pre-reaction chamber where both said first and said second phase reactants have entered the pre-reaction chamber and said pre-reaction chamber being aligned downstream with said reaction chamber and having a single outlet that is directly connected with ~~econfigured such that all the reactant gas entering the pre-reaction chamber is transferred to~~ said reaction chamber, and said first substrate being a separate element from the walls of the pre-reaction chamber;

feeding the pulse of the first vapor phase reactant into said pre-reaction chamber and over the first substrate and subsequently into said reaction chamber and over the second substrate;

reacting the first vapor phase reactant with said surface of said first substrate and subsequently with a surface of said second substrate to form a thin film on said first and second substrates, wherein residual first vapor phase reactant remains in said pre-reaction chamber; and

feeding a pulse of a second vapor phase reactant into said reactor, wherein said second vapor phase reactant reacts with said residual first vapor phase reactant to form a solid reaction product in said pre-reaction chamber on said first substrate and said second vapor phase reactant subsequently reacts with said surface of said second substrate in said reaction chamber.

2. **(Original)** The method of Claim 1, wherein said residual first vapor phase reactant is in the gas phase.

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3. **(Previously presented)** The method of Claim 1, wherein said residual first vapor phase reactant is adsorbed on the walls of the reaction chamber.

4. **(Previously presented)** The method of Claim 1, wherein said reaction chamber comprises a pre-reaction chamber in which the first substrate is positioned and a second reaction chamber in which the second substrate is positioned, wherein said pre-reaction chamber is upstream of said second reaction chamber.

5. **(Original)** The method of Claim 4, wherein said second reaction chamber is operated under conditions conducive to ALD.

6. **(Canceled)**

7. **(Original)** The method of Claim 4, wherein said residual first vapor phase reactant is present in said pre-reaction chamber.

8. **(Original)** The method of Claim 4, wherein said reaction product is formed in said pre-reaction chamber.

9. **(Original)** The method of Claim 1, further comprising repeatedly alternately feeding at least said first vapor phase reactant and said second vapor phase reactant.

10. **(Canceled)**

11. **(Original)** The method of Claim 1, further comprising feeding a plurality of vapor phase reactants into said reactor.

12. **(Original)** The method of Claim 1, wherein said second vapor phase reactant reacts with said residual first vapor phase reactant under conditions conducive to chemical vapor deposition.

13. **(Original)** The method of Claim 4, wherein said pre-reactor is placed immediately adjacent to the said second reaction chamber and it is adapted to be freely communicating with the second reaction chamber.

14-15. **(Canceled)**

16. **(Original)** The method of Claim 4, wherein said pre-reactor is operated under conditions conducive to chemical vapor deposition so as to form said solid reaction product.

17. **(Previously presented)** The method of Claim 4, wherein said second vapor phase reactant is reacted with the residual first vapor phase reactant to form said solid reaction product so

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as to deplete the residual first vapor phase reactant, thereby preventing said residual first vapor phase reactant from entering said second reaction chamber.

18. **(Original)** The method of Claim 4, wherein the pre-reactor is operated at the same temperature as the second reactor.

19. **(Cancelled)**

20. **(Currently amended)** A method for growing a thin film on a surface of a substrate in a reaction chamber comprising a plurality of walls according to the ALD method, said method comprising:

feeding a pulse of a first vapor phase reactant into said reaction chamber;

reacting the first vapor phase reactant with said surface of said substrate to form a thin film on said substrate, wherein residual first vapor phase reactant remains in said reaction chamber; and

feeding a pulse of a second vapor phase reactant into said reaction chamber,

wherein said second vapor phase reactant reacts with said residual first vapor phase reactant to form a solid reaction product in said reaction chamber; and

wherein the reaction product is deposited on a removable medium positioned upstream of said substrate and downstream of a point where both the first and second vapor phase reactants have entered the reaction chamber;

removing said removable medium from said reaction chamber, wherein said removable media medium is a separate element from the walls of said reaction chamber.

21. **(Original)** The method of Claim 4, wherein the reaction product is formed on the inner walls of the pre-reactor, and the reaction product is removed from the pre-reactor by cleaning the walls.

22. **(Original)** The method of Claim 4, wherein a concentration of said residual first vapor phase reactant in said pre-reactor is reduced to less than 1 ppm by reacting said residual first vapor phase reactant with said second vapor phase reactant.

23. **(Original)** The method of Claim 4, wherein a concentration of said residual first vapor phase reactant in said pre-reactor is reduced to a concentration of less than 1 vol-% by reacting said residual first vapor phase reactant with said second vapor phase reactant.

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24. **(Original)** The method of Claim 1, further comprising feeding an inactive gas into said reactor after feeding said first vapor phase reactant or said second vapor phase reactant.

25. **(Original)** The method of Claim 24, further comprising evacuating said reaction chamber while feeding said inactive gas.

26. **(Original)** The method of Claim 1, wherein a pressure in said reaction chamber is in the range of 1 to 100 mbar.

27-35. **(Canceled)**

36. **(Currently amended)** A method for growing a thin film on a surface of a substrate in a reaction chamber according to the ALD method, said method comprising:

feeding a pulse of a first vapor phase reactant into said reaction chamber;

reacting the first vapor phase reactant with said surface of said substrate to form a thin film on said substrate, wherein residual first vapor phase reactant remains in said reaction chamber; and

feeding a pulse of a second vapor phase reactant into said reaction chamber,

wherein said second vapor phase reactant reacts with said residual first vapor phase reactant to form a solid reaction product in said reaction chamber; and

wherein the reaction product is deposited in an independent pre-reaction chamber ~~that is configured has a single outlet that is directly connected with such that all the reactant gas entering the pre-reaction chamber is transferred to said reaction chamber and said pre-reaction chamber being positioned upstream of said substrate and downstream of a point where both the first and second vapor phase reactants have entered the reaction chamber.~~